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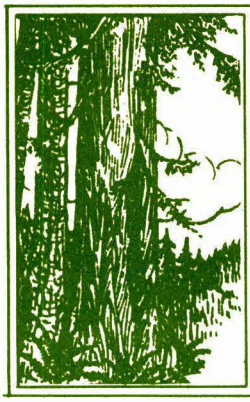
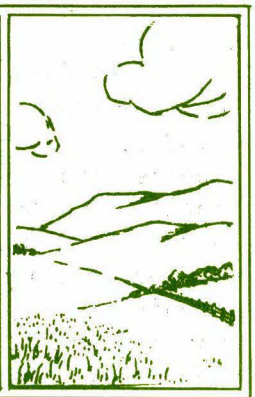


FOREST RESEARCH NOTES

U.S.DEPARTMENT OF AGRICULTURE
FOREST SERVICE
CALIFORNIA FOREST AND RANGE
EXPERIMENT STATION *

STEPHEN N. WYCKOFF, Director



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RELATIVE RATING OF FORAGE SPECIES FOR RESEEDING FOREST RANGES IN NORTHEASTERN CALIFORNIA

By Donald R. Cornelius, Range Conservationist1/

"What to plant?" is usually the first question to be asked when artificial reseeding is considered for the improvement of deteriorated range. To help answer the question, forage plants have been tested by the California Forest and Range Experiment Station on the Lassen, Modoc, and Plumas National Forests since 1946. This paper gives relative ratings of 46 species, on the basis of their performance during the first 3 years of testing. Twenty of these species are native to the United States; 26 are introductions from foreign countries. Twenty of the 46 species were rated good or better for the ponderosa pine zone, but only 3 for the Great Basin sagebrush zone.

For these tests, nursery row seedings were made in each of the 3 years at different locations in the Great Basin sagebrush zone at an elevation of about 4500 feet, and in the ponderosa pine zone at elevations of 5600 to 7500 feet. In each of the zones the sites selected for seeding were depleted dry range areas dominated by sagebrush. The results are not applicable to wet meadow sites.

1/ The author appreciates the cooperation given him by the Soil Conservation Service Nursery Division, Pacific Coast Region, for supplying a large amount of the seed used for testing; the Bureau of Plant Industry, Soils, and Agricultural Engineering, and the University of California Agricultural Experiment Station for some seed used; and Mr. J. C. Hays and Mr. T. S. Brown, Farm Advisors of the University of California Extension Service, for suggestions regarding species to test.

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* MAINTAINED AT BERKELEY, CALIFORNIA, IN COOPERATION WITH THE UNIVERSITY OF CALIFORNIA.
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The experimental areas were not cultivated after seeding but were treated in the same way as large-scale reseeding projects, including protection from livestock grazing for at least 2 years. Each species was planted in a separate 5- by 20-feet plot. The plots were replicated twice and randomized at each of the site locations. Seedbed preparation included plowing with one-way wheatland plow in the summer to eradicate the sagebrush, and light discing in the autumn to smooth the seedbed before marking the rows for hand seeding. A six-row runner-type marker, constructed of 2- by 4-inch boards set on edge and pulled by a wheel tractor, was used for making rows about 2 inches deep and 2 inches wide. The rows were spaced 20 inches apart. In making the rows, the runners firmed the soil in the bottom of the rows--an aid in retaining soil moisture. The seed was scattered in the rows by hand and covered by a single-disc grain drill or a heavy log chain dragged across the rows.

Relative ratings from 1 (the highest) to 10 (the lowest) were made for each plot toward the end of each growing season. The first-year rating was on density of stand and vigor. Thereafter, the ratings also considered forage and seed production. The relative numerical ratings were averaged and assigned adjective ratings for use in this report.

High germination and strong seedling vigor are two very important characteristics for species used in reseeding ranges. Although some native plants are well adapted to certain sites, they might not be suitable for use in artificial revegetation if germination is low and seedlings are weak. On the other hand, it should be recognized that such ratings as these give an advantage to species which produce forage quickly. Species that develop slowly and persist over a long period of time may give the highest average yield of forage, but are at a disadvantage when evaluated at the end of 3 years.

A better appraisal of the more promising species will be made after another 2 years. Larger plots now under study will also strengthen the evaluation. Then too, strains of the better species have been obtained from plant breeders or selected from native grasslands and are now under test in range plots. Therefore, the ratings given in the accompanying table may be refined. The present list, however, should prove helpful to range managers wanting to know what species to seed; it represents the best evaluation available from performance in the nursery rows.

ADAPTABILITY OF FORAGE SPECIES
for
Reseeding Ranges in Ponderosa Pine and in
Great Basin Sagebrush Zones of Northeastern California

Species	Ponderosa pine zone	Great Basin sagebrush zone	Native (N) or Introduced (I)
Grasses			
Agropyron cristatum	Good	Good	I
" dasystachyum		Medium	N
" elongatum	Good	Medium	I
" inerme		Good	N
" intermedium	Good	Excellent	I
" riparium	Good	Medium	N
" smithii	Poor	Poor	N
" spicatum	Good		N
" trachycaulum	Good	Medium	N
" trichophorum	Good		I
Agrostis alba	Poor	Failure	I
" alba tenuis	Medium		I
Alopecurus pratensis	Good		I
Arrhenatherum elatius	Poor	Failure	I
Bromus erectus		Poor	I
" inermis	Good	Poor	I
" marginatus	Medium	Poor	N
Dactylis glomerata	Good	Poor	I
Elymus canadensis	Good	Medium	N
" glaucus	Medium	Poor	N
" junceus	Poor	Poor	I
" triticoides	Medium		N
Festuca arundinacea	Good	Failure	I
" idahoensis	Poor	Poor	N
" ovina	Medium		I
" rubra commutata	Medium	Poor	I
Hordeum bulbosum	Medium	Failure	I
Lolium perenne	Medium		I
Oryzopsis hymenoides		Failure	N
Phalaris arundinacea	Medium		N
Phleum pratense	Good	Failure	I
Poa ampla	Good	Medium	N
" nevadensis	Good	Failure	N
Stipa lemmoni		Medium	N

ADAPTABILITY OF FORAGE SPECIES
for
Reseeding Ranges in Ponderosa Pine and in
Great Basin Sagebrush Zones of Northeastern California (Cont.)

Species	Ponderosa pine zone	Great Basin sagebrush zone	Native (N) or Introduced (I)
Legumes			
Astragalus cicer	Good		I
" falcatus	Medium		I
Lotus americanus	Poor	Failure	N
" corniculatus	Good		I
" uliginosus	Good		I
Lupinus calcaratus	Good	Poor	N
Medicago sativa-falcata	Poor	Medium	I
Melilotus officinalis	Good		I
Trifolium hybridum	Poor	Failure	I
" involucratum	Medium		N
" repens latum	Poor	Failure	I
Browse			
Purshia tridentata	Poor	Failure	N